1988 Annual editorial index

The "Annual Editorial Index" is designed to put a year's worth of **BE** articles at your fingertips. Here's how you use it.

The index begins with a month-by-month compilation of all feature articles, regular columns and field reports that appeared in the magazine during the past year. Each article review includes a brief list of key words—words and phrases that were defined and used in the story—along with a reader interest classification. Related article material is indicated, when applicable.

Beginning on page 114, you will find a cross-reference listing of articles and columns, arranged alphabetically by general subject area. If you know you saw an article about a particular topic, but can't remember which issue, this listing will guide you in the right direction, and maybe lead you to a related article.

(Subject listings begin on page 114)

JANUARY 1988

Theme: Broadcasting From the Field

Editorial (page 6)
- News Technology

(Innovation and quality programming result from cooperative efforts among departments at the station.)

FCC Update (page 8)
- Eligible Daytime AMs May Operate Full Time
- Presunrise Rule
- Technical Standards for Cable Broadcast Switches
- TV-to-Land-Mobile Interference Issue

Strictly TV (page 10)
- Bird Watchers' Guide to Computer Graphics

(Classification of the varieties of digital video products is difficult when they contain many of the same functions.)

re:Radio (page 12)
- Updating Your Proof-of-Performance

(Monitoring directional antenna performance may require establishment of new monitor points; DA-NDA antenna switching systems.)

Satellite Technology (page 14)
- Using Parabolic Antenna Systems, Part 2

(A look at parabolic antenna gain, types of losses and antenna efficiency.)

Circuits (page 16)
- Inside Digital Technology, Part 16

(The concept of number systems includes binary, decimal and hexadecimal systems and conversion methods.)

Troubleshooting (page 18)
- Maintaining Computer Storage Devices, Part 1

(A discussion about hard disk drive media testing, drive repair and computer disk memory system troubleshooting.)

Management for Engineers (page 20)
- Time Management, Part 2

(Keeping a time diary can help you keep tabs on your valuable work time.)

- **Mobile Mast Safety** (page 26)

By Richard Wolf, Wolf Coach, Auburn, MA

Pressure to get the story creates situations in which staff members are more likely to stretch safety policies. The operator of the vehicle must be aware of elevated masts, overhead power lines or other obstructions and proper vehicle parking procedures. To reduce hazards and prevent accidents, safety must be made a priority.
Interest: remote field crew technicians, engineers; production crews.
Key words: mobile vehicles, ENG masts, parking procedures.

- **Applying Cellular Technology** (page 36)

Edited by Brad Dick, radio technical editor

Like 2-way radio, cellular telephones provide needed communication between remote crews and station personnel without the usual problems of station-maintained repeaters and typical 2-way equipment. The burden of system operation falls to the cellular operator, except for the cellular units in station vehicles. The network of cellular systems allows greater communications range and flexibility.
Interest: engineering, management, production.
Key words: mobile telephone systems, geographic sharing, mobile telephone switching offices, cells, paging channels, hand-off, trunking, roaming.

- **Catching the News Crew** (page 46)

By Ron Smith, KENS-TV, San Antonio, TX

Trunking radio—using frequencies in the 800MHz spectrum—increases communications flexibility and channel capabilities while adding a new level of information security. Similar to cellular radio in some respects, trunking expands the reach of normal 2-way transmitter-receiver equipment.
Interest: engineering, production, remote technicians.
Key words: trunking, radio channel efficiency, information security, hand-helds.

- **Powering Portable Production** (page 58)

By F. Kurt Shafer, The Energy Source, Manhattan Beach, CA

Rechargeable batteries provide a more economical means of powering portable equipment than non-rechargeable sources. The discussion covers different types of battery technologies as well as the proper care and

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handling of lead-acid, NiCad and silver zinc devices. Comparisons of the three battery types show strong and weak points of various portable powering units.
Interest: engineering, remote technicians, production.
Key words: primary/secondary batteries, amp-hour ratings, longevity, cost for power, dendrites, memory effects, self-discharge, sulfation, C rate of discharge, fast charging, cutoff.

• **Stereo Microphone Techniques** (page 80)
By Stephen Toback, University of Miami, Coral Gables, FL
Achieving quality stereo sound and mono compatibility places special demands upon correct microphone placement. One or more of four kinds of audio cues, enabling the ear and brain to localize the source of a sound, play a role in stereo mic techniques. Those involving time differentials create problems with mono compatibility.
Interest: audio engineers/technicians, production.
Key words: aural cues, phase differences, acoustic baffles, bidirectional mics, mono compatibility, ORTF, NOS, DIN, M-S stereo, comb filtering.

Show Replay (page 104)
• A Back-to-Back Success
By Brad Dick, radio technical editor
(The National SBE Convention and Broadcast Engineering Conference brings double the attendance of the 1987 event and is rated a success by exhibitors and attendees.)

Show Replay (page 108)
• 129th SMPTE Reflects New Attitude on HDTV
By Jerry Whitaker, editorial director
(High-definition television dominated the conference, along with additional digital video products.)

Applied Technology (page 114)
• Rank Cintel Gallery System
By J. T. Way, Rank Cintel
(An examination of digital still-image storage and management techniques in the Logica/Rank Cintel system focuses on system requirements, digitization processes, image manipulation and modification, as well as retrieval capabilities.)

Field Report (page 118)
• da Vinci Unified Color Correct System

Station-to-Station (page 122)
• Split Signals Without Sacrifice
By Jack Cunkelman, WLWT-TV, Cincinnati
(Suggestions explain lattice-splitter pads and active combiner circuitry and construction.)

SBE Update (page 124)
• McKain Plans to Build on the Past
• Chapter Chairmen's Meeting
• 1988 Convention Dates

FEBRUARY 1988

Theme: Digital Technology for Broadcasting

Editorial (page 6)
• The Road to Success
(SBE continues to grow in membership, in its status as a professional organization and in terms of its national convention.)

FCC Update (page 8)
• Focus is on Tower Lighting and Painting
• Obscenity and Indecency Policy
• Equipment Authorization Procedures
• Must-Carry Rules Rejected

Strictly TV (page 10)
• Prepare for Graphics Hardware Repair
(A better understanding of the elements of a graphics system makes it easier to learn repair procedures of such equipment.)

re:Radio (page 12)
• Bring Your DA Back With Phaser Rocking
(Careful phaser adjustments, each followed with measurements at monitor points, can return a DA to its licensed parameters; transverse radials can help locate DA phase errors.)

Satellite Technology (page 14)
• About Waveguide Components
(Isolators, directional couplers, circulators and power splitters play a part in many typical satellite uplink/downlink systems.)

Circuits (page 16)
• Inside Digital Technology, Part 17
(This continuing discussion of digital ICs focuses on decoding of thumbwheel switches, decimal-binary converters, ROM, shift-subtract-shift and various math conversions.)

Troubleshooting (page 18)
• Maintaining Computer Storage Devices, Part 2
(Suggested procedures to keep the computer disk-based memory operating at top performance include head alignment and drive read/write functional tests.)

Management for Engineers (page 20)
• Time Management, Part 3
(If you conduct a careful audit of your time, you probably will find that 80% of what you achieve is accomplished in 20% of your time.)

• **Disk Recording Technology** (page 26)
By Jerry Whitaker, editorial director
Hard disk drives have become an integral part of audio and video recording systems. Other types of disk recording units also find applications in broadcasting and related industries. The article examines how these disk units operate and some of the requirements that are placed upon such technologies to make them usable in audio-video systems.
Interest: engineering, technicians.
Key words: Winchester drive, head actuator, voice coil assembly, servo surface, flying heads, access times, sectors, cylinders, data tracks, error correction, Nyquist criteria, WORM drive, magneto-optical disk, Kerr rotation, modulated laser beams.

• **Controlling Graphics Systems** (page 46)
By Carl Bentz, technical/special projects editor
The input interface to computer-controlled equipment largely determines how easily the equipment interprets the operator's instructions. The user interface combines programming with the actual input device, such as keyboard, light pen, mouse or touch-screen. Personal preference plays a part in the selection of an input device for the system as well.
Interest: video engineers, production technicians.
Key words: low-level, high-level programming; assemblers, interpreters, tokens, compilers, peripherals, distributed intelligence, RISC, ASIC, bit-slice, pipelining, graphics pads, styli, mice.

• **HDTV: Where It Is, Where It's Going** (page 62)
By Jerry Whitaker, editorial director
Because of the economic, political and technical implications of HDTV in the United States, where does it fit in? Should the system be NHK, MUSE or one of the U.S.-sourced improved-definition systems? An overview of the systems contains the latest listing of their parameters and includes interviews with Julius Barnathan, ABC; Joseph Flaherty, CBS; and Michael Sherlock, NBC.
Interest: engineering, management, production.
Key words: HDTV, MUSE, NHK 1125/60, ACTV, the Glenn system, HD-NTSC, HDMAC-60, Del Ray.

• **HDTV: The European View** (page 94)
By Howard T. Head, **BE** European correspondent
European implementation of HDTV awaits a choice of field frequency, although 50Hz may win, based on proposed compatibility with the vast number of receivers currently in use. The Eureka 95 HDTV demonstration (Berlin, August 1987) proposed a picture viewable on standard TVs, containing information that can be decoded by HDTV models for additional resolution and width. Factors steering Europeans away from Japanese HDTV systems are national pride and economics.
Interest: management, engineering, production, programming.
Key words: flicker, Eureka 95, aspect ratios, production standards, MAC packets, DBS.

• **Time Synchronization for Broadcasters** (page 108)
Edited by Brad Dick, radio technical editor
Broadcasters are interested in time, either for a program or for a commercial. For many years WWV, WWVH and WWVB have provided time announcements, standard time intervals, standard frequencies, Universal Time corrections, meteorological information and BCD time code. The article describes the signals transmitted by these National Bureau of Standards time and frequency stations.
Interest: engineering.
Key words: NBS, time scales, cesium or atomic clocks, time pulses, BCD codes, GEOS time signals, state selection.

• **News Special Report: Europe Enters the New Era of DBS** (page 122)
By Howard Head, **BE** European correspondent
TV SAT-1 initiates DBS service to a large portion of Europe using MAC D-2 transmission standards.

SBE Update (page 126)
• Deadlines Coming up for Scholarships

Telex Announcers Headsets Cover Every Broadcast Need Comfortably

Each unique announcing situation can require a different headset. Is there a lot of noise in the background or are you in a quiet studio? Do you want to include or eliminate the ambient noise around the announcer? Is there a need for the announcer to be able to monitor more than one sound source? What about impedance differences, or microphone audio quality.

You could probably get by with a standard "all-around" headset, but do you really want to? Similarly, you could probably find something that would "make-do" from a headset source offering only a couple of models from which to choose. But, for a complete selection, one that offers a solution to your every broadcast need, turn to Telex.

	MICROPHONE					EARPHONE					
	TYPE			ELEMENT		TYPE		ELEM	OHMS		
	OMNI	N/C	UNI	DYN	COND	BIN	MONO	MAG	150	300	600
Full Cushion	X		X	X	X	X		X	X	X	X
Light Weight	X	X			X	X	X	X	X	X	

Camera

The above chart indicates the wide variety of styles and specifications available in our announcers' headsets. Ask about our full line of camera and intercom headsets as well. Call or write to:
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9600 Aldrich Av. S., Minneapolis, MN 55420

Intercom

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• Certification Exams
• Sustaining Membership
• New Board of Directors

Station-to-Station (page 130)
• Designing a Time-Code Reader
By John McGaughey, Univ. of Georgia, Athens, GA
(Development of a time clock system uses drop-frame mode of time-code generator.)

Applied Technology (page 132)
• Adaptive Delta Modulation
Edited by Brad Dick, radio technical editor
(An examination of A/D and D/A conversions includes the use of adaptive techniques based on instantaneous signal levels.)

Field Report (page 136)
• Eventide BD980 broadcast delay

MARCH 1988

Pre-NAB Show Issue

Editorial (page 6)
• The Audience is Watching
(When previewing products at shows, consider what will improve your signal.)

FCC Update (page 8)
• AM Stereo Policy Affirmed
• Minority and Female Preferences Reinstated
• FCC Asserts Jurisdiction Over Obscene Broadcasts

Strictly TV (page 10)
• Y/C Systems Require New Test Signals, Part 1
(The latest generation of component video and component recording equipment calls for new and different kinds of test signals.)

re:Radio (page 12)
• Working With DA Design Constraints
(Directional antenna system design depends upon the site, economic means and aeronautical concerns.)

Satellite Technology (page 14)
• Communications Plans Brew Controversy
(Two areas of contention in communications involve the use of the mobile satellite service and satellite transmission vs. fiber-optic signal transportation.)

Circuits (page 16)
• Inside Digital Technology, Part 18
(Explanations involve irrational and binary fractions, decimal-to-binary conversion and changing from binary numbers.)

Troubleshooting (page 18)
• Monitoring the Digital Bus
(Determining how digital signals are behaving in a system suggests a type of digital probe that can turn the set of digital pulses on a parallel bus into video.)

Management for Engineers (page 20)
• When Your Style Cramps Leadership
(How you approach management has a definite effect on your leadership skills.)

SBE Update (page 22)
- McKinney Receives Fellowship Award
- Convention Plans Confirmed
- Membership Dues Increase
- Current Voting Procedures
- Frequency Coordination Handbook
- Certification Exams at NAB

• **Breaking New Ground: the MSDC Klystron** (page 36)
By Jerry Whitaker, editorial director
UHF, high power and high cost go hand in hand, but the development of the MSDC klystron (multistage depressed collector) brings to light the possibility of much higher efficiency for UHF TV. A series of collector elements, each at a different potential, returns electrons to the circuit more efficiently. The more complex power supply and cooling systems are offset through the higher efficiency of the advanced technology.
Interest: engineering.
Key words: depressed collector, cooling systems, beam-reconditioning, secondary yield, sputter coating.

• **Comparing Klystron Designs** (page 54)
By Jerry Whitaker, editorial director, and Earl Blankenship, Varian Associates, Palo Alto, CA
External vs. integral cavities and 4-cavity vs. 5-cavity klystron designs have been the subject of many debates about UHF efficiency, reliability and cost. Misconceptions about the two types of UHF power devices have developed over the years, but product improvements, different tuning methods and studies show the differences between the two devices are not as great as we may have thought.
Interest: engineering, engineering management.
Key words: integral/external cavity, 4-/5-cavity, tuning, saturated efficiency, peak-of-sync figure of merit, compliance, beam pulsing, device longevity, MTTR, MTBF.

• **In the Chips** (page 70)
By Terry Pennington and Larry Winter, Rane Corporation, Mountlake, WA
Solid-state devices simplified the matter of designing operational amplifiers, but when the integrated circuit form of the op-amp appeared, many broadcast equipment items became smaller. A tutorial on the operation of op-amp circuits and the major parameters of these devices provides insight on the desirability of the solid-state units.
Interest: engineering, technicians.
Key words: op-amp, open/closed loop gain, infinite bandwidth, common mode rejection ratio (CMMR), inverting, non-inverting, slew rates, noise, negative/positive feedback.

• **Researching the Future** (page 84)
By Jerry Whitaker, editorial director
The broadcast industry can thank applied research efforts for many of the advancements in equipment performance. The closing of the RCA/Sarnoff Labs and the CBS Labs ended an important era of network involvement in research and development—or did it? The question is discussed by ABC, CBS and NBC engineering top brass.
Interest: engineering, management.

• **80-90 One Year Later** (page 98)
By Jerry Whitaker, editorial director
FCC Docket 80-90 brought many changes to the FM broadcast world with expanded classifications of stations, new antenna-height rules and more stringent power-level rules. The regulations brought about changes in the approach to new facility design. A case study examines the circumstances of a construction project under 80-90.
Interest: radio engineering, management.
Key words: Docket 80-90, FM classes, community tower facilities, FAA approvals, cantilever design, RS-222-D, Docket 86-144, FM reclassification.

• **A New Home for PBS** (page 124)
By Brad Dick, technical editor
Forced to move from its Washington, DC, location after a fire, PBS has established its technical operations center in Alexandria, VA. In the process of moving, the new PBS center incorporated many advanced products. The design goals included system and plant integration and automation.
Interest: engineering, management.
Key words: HVAC, grounding, UPS, interconnection, routing, downloadable mnemonics.

• **Acoustical Design and Construction** (page 268)
By Eric Neil Angevine and Renee Kolar, Oklahoma State University, Stillwater, OK
Acoustics is a critical factor in the design of studio facilities, yet many architects contracted for facilities design have little understanding of the science of sound. This tutorial approach to sound and its control shows why more emphasis must be placed on acoustical concerns during the design and construction phases.
Interest: engineering, audio technicians, technical management.
Key words: acoustics, acoustical comfort, sound intensity, transmission, reflection, absorption, Sabins, reverb, diffusion, noise control, bass traps, quiet.

• **High-Definition Radio: Will It Work?** (page 296)
By Douglas Fearn, D.W. Fearn & Associates, West Chester, PA
High-definition radio (HDR) is proposed for AM operation in the UHF band. With mandatory FMX encoding, the result would be a high-quality broadcast service. Phase-locked loop (PLL) synthesized tuning of FM receivers could make it possible to receive the new service without a complete receiver design change.
Interest: engineering, radio technical management.
Key words: HDR, FMX.

• **News Special Report: VOA Program Trains Field Engineers** (page 320)
By Brad Dick, technical editor
The Voice of America has developed a program to teach engineers how to operate high-power broadcast installations.

Applied Technology (page 302)
- Digital Modulation: DX-10 AM Transmitter
Edited by Brad Dick, radio technical editor
(The DX-10 AM transmitter uses 48 RF amplifier stages and controlled logic signals to achieve amplitude modulation.)

Field Report (page 330)
- Howe Technologies Phase Chaser 2300

APRIL 1988

Theme: Automation in Broadcasting

Editorial (page 6)
- Engineering for Utility
(People buy things for different reasons, based on place, function, need and time. To keep listeners and viewers tuned in, they must be given utility as well.)

FCC Update (page 8)
- Minority Preference System Reactivated
- Problems/Programs Listing Conformed
- Carroll Doctrine and "UHF Impact" Policy Rescinded

Strictly TV (page 10)
- Y/C Systems Require New Test Signals, Part 2
(New small-format, better-than-broadcast VCR performance is improved through butterfly and special interchannel timing test signals.)

re:Radio (page 12)
- Reducing AM Band Skywave Interference
(The fading wall, the composition of received signals and new antenna designs to reduce skywave radiation are discussed.)

Satellite Technology (page 14)
- Basic Operations of Modern Satellites
(Two methods of satellite stabilization and housekeeping are examined.)

Circuits (page 16)
- Inside Digital Technology, Part 19
(Expressing large and small numbers with scientific notation requires special consideration in conversion to digital counting systems.)

Troubleshooting (page 18)
- CD Player Repair Requires Skill, Part 1
(CD player troubleshooting means a mix of spindle motor, tracking, radial/traverse and laser focus servos.)

Management for Engineers (page 20)
- When Your Style Cramps Leadership, Part 2
(Leadership style for management is shaped by many factors, including external influences of the company and past experiences of the staff.)

• **Perspective on Broadcast Automation** (page 26)
By Peter Granet, technical writer, Weybridge, UK
Broadcast automation requires more than just human intelligence to plan and construct computer-driven systems. But a successful, effective implementation of automation requires that the computer change the station operations as little as possible. How well the staff accepts automation will have a great deal to do with how disruptive it is.
Interest: engineering management, station management.
Key words: firmware, software, EOM, process control.

• **RoboCam** (page 32)
By Rick Lehtinen, TV technical editor
Programmed control of the camera lens and support systems has become a reality for the TV and production studios. Servo-controlled truck, dolly, pedestal, pan and tilt now join the intricate servo systems that have been used with camera lens systems for some years. The discussion focuses on requirements placed on the mechanisms suitable for automated camera operation.
Interest: engineering, technical management, station management, production.
Key words: camera robotics, X–Y positioning systems, auto-tracking, talent tracking.

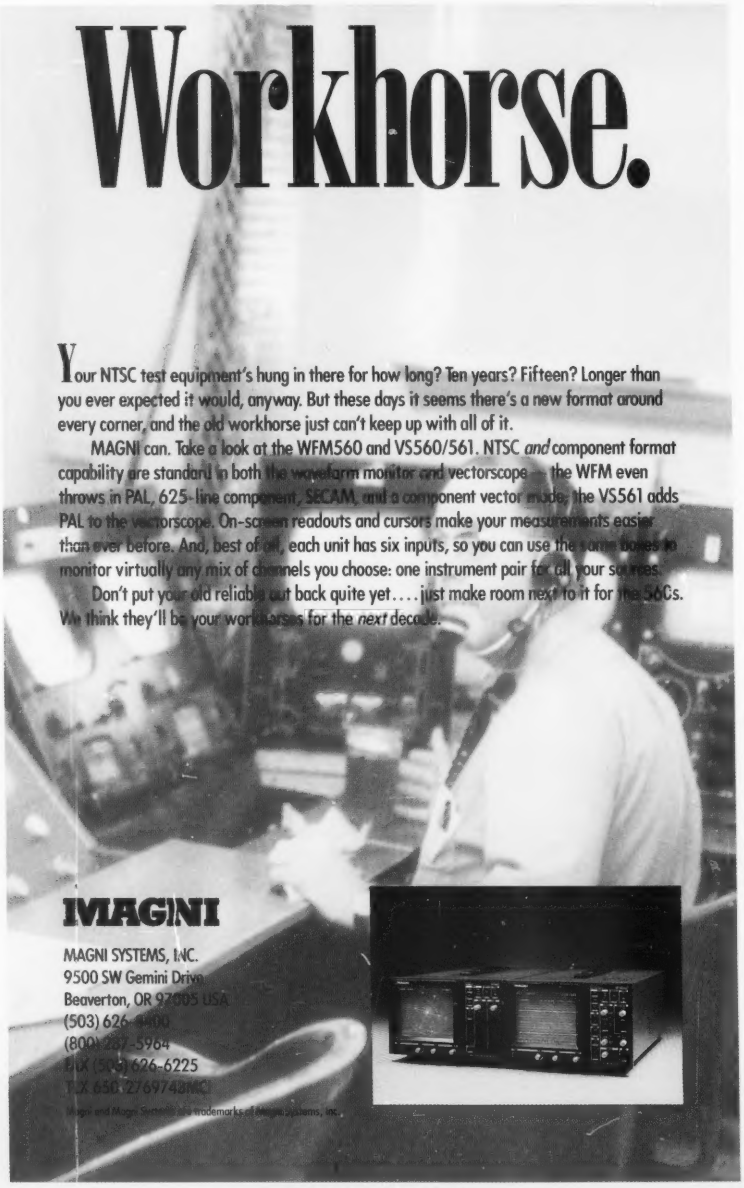
• **Transmitter Remote Control** (page 46)
By Harold Hallikainen, Hallikainen and Friends, San Luis Obispo, CA
The repertoire of modern remote-control systems for transmitters is varied and flexible and includes the capability to customize functions for almost any level of manual operation to full automation. From the simplest of systems (transmitter and studio units) for single-site control to highly complex multiple-site, multiple-control-point systems, several methods can be used to interconnect the system units for communications.
Interest: engineering, transmitter engineers, technical management.
Key words: ATS, multisite, multiple control point, metallic pairs, duplex, half-duplex, FSK, DTMF/voice, P-channels, remote intelligence, control points, monitor points, common-mode voltage range, tower light sampling, satellite link.

• **Installing Computer Hardware** (page 68)
By Brad Dick, radio technical editor
Installing a computer or computer-controlled system in the broadcast facility involves more than just plugging it in. Standby power and uninterruptible power supply (UPS) systems are necessary to protect the systems and to keep them running. Environmental concerns and proper interfacing, including RS-232, also are essential.
Interest: studio maintenance technicians, engineering management.
Key words: standby power, UPS, environment, RS-232, LAN, crosstalk.

• **Facility Design Using CAD** (page 90)
By Curtis Chan, Centro, Salt Lake City
Computer-aided design and engineering software (CAD, CAE) for personal computers serves a variety of useful purposes around the broadcast and production area. From the cut-and-paste layout stage to determining whether the equipment will fit the allocated space to preparing 3-D renderings of a control room to producing completed drawings of system wiring, CAD and CAE can make the design project much easier. The drawing time is further shortened through the use of libraries of predrawn components for wiring diagrams.
Interest: engineering, technical management.
Key words: CAD, CAE.

• **It's About Time** (page 100)
By Robert Kastigar, WGN-TV, Chicago
Programming and commercial break timing are important to the economy of the TV station. This discussion considers the number of TV frames contained in various time segments and makes suggestions on how this information can be used to clean up program/commercial switching for a smoother look and a reduction in the number of make-goods necessary.
Interest: engineering, operations, production.
Key words: time resolution, drop-frame time code.

• **Time Code: Bridging the Gap** (page 106)
By Rick Lehtinen, TV technical editor
Cutting and splicing still may be used for editing with some audiotape and film, but for videotape, electronic editing is much more practical. The key to precise editing of audio and video from film, tape or disk is the use of SMPTE (and EBU) time codes. The longitudinal and vertical interval code types—and more recently, MIDI (musical instrument digital interface) code—allow flexible, but frame-accurate, editing not possible with cut/splice or punch-n-crunch manual methods.
Interest: engineering, production technicians.
Key words: BCD, LTC, VITC, SMPTE, EBU, time code, frame count, user bits, MIDI, virtual track ATR.


Workhorse.
Your NTSC test equipment's hung in there for how long? Ten years? Fifteen? Longer than you ever expected it would, anyway. But these days it seems there's a new format around every corner, and the old workhorse just can't keep up with all of it.
MAGNI can. Take a look at the WFM560 and VS560/561. NTSC and component format capability are standard in both the waveform monitor and vectorscope – the WFM even throws in PAL, 625-line component, SECAM, and a component vector mode; the VS561 adds PAL to the vectorscope. On-screen readouts and cursors make your measurements easier than ever before. And, best of all, each unit has six inputs, so you can use the same boxes to monitor virtually any mix of channels you choose: one instrument pair for all your sources.
Don't put your old reliable out back quite yet.... just make room next to it for the 56Cs. We think they'll be your workhorses for the next decade.
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Circle (70) on Reply Card

Field Report (page 116)
• Vital station automation manager

Station-to-Station (page 126)
• Test Signal is More Than Reference Level
By Frederick M. Baumgartner, KHOW-AM and KSYY-FM, Denver
(A multiple-purpose test generator creates a 4-part signal useful for level setting, phase checks, tape-speed measurement, wow and flutter checks and audio channel identification.)

SBE Update (page 134)
• Goals, Committees Set for Coming Year
• Convention-related Committees
• Public Relations, Membership Committees
• Job Bank
• National Office Expands

MAY 1988

Theme: Transmission Systems Special Report

Editorial (page 6)
• Graphics Steps Up to Bat
(The popularity of computer graphics has brought broadcasters face to face with computer whizzes, and that means the opportunity to learn from one another.)

FCC Update (page 8)
• FM Short-spacing to be Studied
• IF Distance Separations Examined
• FM "Downgrading" Procedures to be Streamlined
• TV Technical Rules to be Streamlined
• Public File Retention Period Changed

Strictly TV (page 10)
• Inside NTSC Encoders
(Improved filtering, detail processing and other encoder techniques deliver better NTSC signals to viewers.)

re:Radio (page 12)
• DA's Origin is in Parasitic Radiators
(Antenna pattern directivity results from distortion caused by the introduction of non-driven elements into the RF field.)

Satellite Technology (page 14)
• Scrambling Methods Change With Cable
(Restricting access to TV signals by unauthorized viewers has passed from polarity inversion and simple filters to digital methods.)

Circuits (page 16)
• Inside Digital Technology, Part 20
(A/D converters bring an analog world to the digital forefront.)

Troubleshooting (page 18)
• CD Player Repair Requires Skill, Part 2
(CD player servo systems can operate only if the laser and recovery circuits function properly.)

Management for Engineers (page 20)
• Work Scheduling Increases Efficiency
(Well-defined work schedules will reduce the frequency of last-minute, hastily performed projects.)

Transmission Systems Special Report:

• **Safety: The Key to Staying Alive** (page 26)
By Brad Dick, technical editor
Respect for electricity, a necessity in every broadcast installation, demands the attention of the technician and engineer. Electrical shock, and methods to avoid it, are explained in this safety tutorial. Suggestions are given for planning an effective safety program.
Interest: all station personnel.
Key words: electrocution, ground faults, safety testing, protective equipment, grounding, OSHA rules, National Electrical Code.

• **Grounding Procedures for Broadcast Facilities** (page 46)
By Jerry Whitaker, editorial director
The well-designed ground system provides protection for operators and equipment from electrical line disturbances and stray RF energy. Proper grounding improves broadcast signal quality. The article discusses proper grounding methods to keep the ground system from becoming visible to station employees as well as listeners and viewers.
Interest: engineering, technical management.
Key words: power-line disturbances, earth grounds, ground rods, chemical grounding methods, grounding systems, cadwelding, skin effects, star ground point.

• **Selecting Coaxial Cable** (page 66)
By Robert D. Perelman and Thomas M. Sullivan, Andrew Corporation, Orland Park, IL
Transmission line plays an important part in any broadcast installation. Coaxial cable material, connectors, hangers and grounding devices form the cable system. That system will serve the station well if proper consideration is given to required power levels, cable lengths and installation methods.
Interest: engineering, technical management, facilities planning.
Key words: coax, characteristic impedance, relative velocity of propagation, propagation modes, dielectrics, tensile and crush strength, VSWR, windloading.

• **Multiplexing FM Transmitters** (page 84)
By Bill DeCormier, Dielectric Communications, Raymond, ME
A variety of reasons have led to increased use of community broadcast sites and multistation antennas. This trend is a result of the development of diplexing and multiplexing systems based on directional coupling devices. The article describes multiplexing operation and factors to be considered when designing a multiple-station transmitting facility.
Interest: engineering, technical management, facilities planning, management.
Key words: Docket 80-90, community broadcast site, branch diplexer, constant impedance diplexer, bandstop and bandpass diplexers, input bandwidth, RF hybrids, intermodulation, group delay, cavities.

• **Reducing IPM in AM Transmitters** (page 106)
By Dominic Bordonaro, WAAF-AM/WFTQ-FM, Worcester, MA
Before AM stereo, few knew of, or understood, incidental phase modulation. IPM exists in all AM installations, but it can be controlled by careful tuning of the transmitter in most cases. Reducing IPM improves spectrum occupancy, transmission efficiency and AM signal quality.
Interest: transmission engineering, technical management.
Key words: IPM, phase modulation, AM, slope detection, phase rotation, PA neutralization, AM stereo.

Applied Technology (page 114)
• The All-Solid-State Video Recorder
By Richard Dienhart, NEC America, Wood Dale, IL
(Factors leading to the development of a solid-state video recording system based on DRAM devices explain the operational concepts of this milestone in semiconductor technology.)

Station-to-Station (page 122)
• RF Tuning for Maximum Performance
By Richard Walsh, WHCN-FM, Hartford, CT
(Suggestions are provided to simplify tuning procedures for FM transmitter engineers.)

Field Report (page 128)
• Calaway CED+ editor

SBE Update (page 134)
• Officer Elections Are Around the Corner
• Continued Growth
• Chapter Rebates
• Sustaining Membership Campaign
• Certification Examinations
• Scholarship Announced
• Awards Committee

JUNE 1988

Theme: NAB Convention Replay

Editorial (page 6)
• A Curtain Call for NAB
(NAB shows courage in firsts, such as HDTV, laser projection, 40GHz STL.)

FCC Update (page 8)
• Exploring the Role of FM Translators
• New Rules for NCE-FM Translators
• Freeze on FM Translator Applications
• Cable Systems Subject to Rate Regulation
• Further Study of Must-Carry

Strictly TV (page 10)
• Good Connectors Prevent Signal Loss
(Fiber-optic material can be spliced when attention is given to the proper connectors and method of installation.)

re:Radio (page 12)
• Designing a Parasitic Array
(The pattern produced by a directional array is related to the height and distance of each element from a reference point, as well as the phase of the RF current fed to the elements.)

Satellite Technology (page 14)
• Satellite Internal Electronics
(An overview of the equipment package aboard communications satellites includes antenna direction control, RF amplification and solar power systems.)

Circuits (page 16)
• Improving Accuracy of the A/D Converter

(A reduction in component count and an increase in the number of comparisons made to detect errors improve quad-slope detection A/D converter accuracy.)

Troubleshooting (page 18)
• CD Player Repair Requires Skill, Part 3
(Operation of the laser diode, its adjustments and the focus servo are examined.)

Management for Engineers (page 20)
• Are You Listening?
(To improve manager-employee communications, various methods help to keep the employee's attention.)

NAB '88 Replay:

• **Engineering Conference Report** (page 28)
By Brad Dick, technical editor
An extensive engineering session program highlights a number of high-technology answers to the complex problems faced by today's broadcaster.

• **Pick Hits of the '88 NAB** (page 68)
By Brad Dick, radio technical editor, and Rick Lehtinen, TV technical editor

Radio products were:
—CompuSonics disk storage and editing system
—Delta Electronics splatter monitor
—Design Radio Labs ACM-1 noise meter
—Gentner Electronics RDA routing distribution amplifier
—Gentner Electronics 3-line frequency extender
—Henry Engineering MixMinus Plus differential summing amplifier
—Moseley RPL remote programming system
—Pinzone Communications Corum anti-skywave AM antenna
—Potomac Instruments 1500 PC intelligent, programmable controller
—TFT 8888 remote pickup unit

TV products were:
—Ampex ACE-25 editor
—Ampex VPR-300 D-2 VTR
—BTS LDK-900 studio CCD camera
—Eventide BD-1000 video/audio delay
—Innovision endoscopic lenses
—Larcan M-series solid-state VHF TV transmitters
—Magni Systems 560 component/composite waveform/vector monitor
—Nikon TV-Nikkor ENG/EFP lenses
—Sony BVW-200 camcorder
—Sony DVR-10 D-2 VTR
—Tektronix VM-700 video measurement set

• **Show of Shows** (page 80D)
Coordinated by Carl Bentz, special projects editor
A comprehensive list of the new products introduced at the equipment exhibition.

SBE Update (page 182)
• New Version of Database Program Released
• Lost Grandfathers
• Certification News
• More Scholarship Awards
• Convention News

JULY 1988

Theme: Audio Technology Update

Editorial (page 6)
• AM: Crisis or Opportunity?
(The critical state of AM can be turned to opportunity if broadcasters, the FCC and Congress correct the deficiencies in the AM delivery system.)

FCC Update (page 8)
• "Syndex" Rules to be Reinstated
• LPTV Filing Window
• Change in Minimum Power Requirements for Class A FMs
• FM "Downgrading" Procedures to be Changed

Strictly TV (page 10)
• A Little TLC for Tape Will Pay Off
(Common-sense suggestions to extend videotape life.)

re:Radio (page 12)
• Measure Performance of DA With rms, rss
(The pattern rms value is a measure of DA efficiency and performance.)

Satellite Technology (page 14)
• The Rocket Engine Makes it All Possible
(An overview of rocket engines discusses propulsion systems, types of propellants and possibilities for the future.)

Circuits (page 16)
• D/A Accuracy Comes at a High Price
(Tolerances of components, internal switches and stability of the reference voltage drive up costs of D/A converters.)

Troubleshooting (page 18)
• CD Player Repair Requires Skill, Part 4
(Data recovery through eight-to-fourteen-bit-modulation detection and adjustment of the EFM eye pattern are the focus of this segment.)

Management for Engineers (page 20)
• Planning for Success, Part 1
(Working hard is no guarantee that your employer will reward you. If you don't look out for yourself, no one else will.)

• **New Approaches to Audio Console Design** (page 26)
By Brad Dick, technical editor
Broadcast consoles have evolved from limited-feature, fixed-application devices to full-feature, flexible designs. Because these consoles have more outputs than yesterday's console had inputs, additional control of each audio source may include EQ, forms of audio processing and even automation. The newest designs, using digital techniques, pack more into smaller space by using assignability with 1-button recall of numerous complete-console setups.
Interest: general, audio engineers/technicians.
Key words: ergonomics, control surfaces, assignability, programmability, dynamic automation, motorized faders, parallel control.

• **Active-Balanced Inputs and Outputs** (page 42)
By Richard Cabot, Audio Precision, Beaverton, OR
This tutorial discussion of audio circuit interfacing investigates balanced lines, differential input circuits, common mode rejection and active-balanced inputs and outputs. Hum and noise often prove to be a problem unless the interfacing circuitry is planned carefully. However, by using proper methods, many of the problems can be alleviated.
Interest: audio engineers, technicians.
Key words: balanced line, actively balanced, differential inputs, common-mode, CMMR, instrumentation grade, RF rejection filter.

• **The Audibility of Electronics** (page 58)
By John Eargle, JME Consulting Corporation, Los Angeles
The price of a piece of equipment does not guarantee performance. What makes one amplifier sound better than another is the manner in which the system is constructed, component interfacing and a proper test environment. Double-blind testing may be the best approach to equipment evaluation.
Interest: audio engineers, technicians.
Key words: double-blind tests, controlled listening environments.

• **Display Technology Update** (page 64)
By Rick Lehtinen, TV technical editor
What's new in CRTs is perhaps best answered by what happens in the last few inches before the electron beam strikes the phosphorescent screen. Shadow masks and flat-square tubes are bringing monitor performance to new levels of resolution and reliability. For many applications, LCDs challenge the common electron-gun, phosphor-screen CRT, but a good deal of work is still necessary to perfect video LCD devices.
Interest: general, video technicians/engineers, digital graphics operators.
Key words: delta-dot, dot-mask, slot-mask, in-line gun, dynamic/static convergence, LCDs, twisted nematics, guest-house displays.

Field Report (page 78)
• Ampex ESS-2 still-store system

Station-to-Station (page 84)
• Testing BTSC Stereo System Parameters
By Eric Small, Modulation Sciences, Brooklyn, NY
(Measurement of separation provides accurate information about modulation levels.)

Show Preview (page 88)
• Back to Brighton
(A look toward the 12th International Broadcasting Convention to be held in Brighton, England.)

SBE Update (page 90)
• Goza Takes Wulliman Board Position
• SBE Committees
• Membership Committees
• Golder Scholarship Awarded
• Convention Committee Survey

AUGUST 1988

Theme: Video Technology Update

Editorial (page 6)
• Invest in Your Future
(Invitation to attend SBE National Convention and SBE/**BE** technical seminars in Denver.)

FCC Update (page 8)
• Comparative Renewal to be Examined
• Compulsory License Reviewed

• Telco Permitted to Enter Cable Business
• Capitol Hill Hearings (cable TV vs. broadcast)
• TV Station Fined for Indecent Broadcast
• HDTV Report Issued

Strictly TV (page 10)
• The Definition of High Definition, Part 1
(Higher-definition television will join the electronic entertainment media alternatives, but questions of NTSC compatibility, aspect ratio and bandwidth continue to obscure the future.)

re:Radio (page 12)
• Know the FCC Rules on DA Calculations
(Computer programs assist in calculating DA and maintaining the DA pattern, but a knowledge of DA theory, operation and careful observation is equally important.)

Satellite Technology (page 14)
• Up, Up and Away
(An examination of the sections of satellite launch vehicles and the sequence of events in a typical launch procedure.)

Circuits (page 16)
• A Dynamic Waveform Can Make Waves
(A D/A converter plays a role in digital-based analog waveform generators.)

Troubleshooting (page 18)
• CD Player Repair Requires Skill, Part 5
(Tracing the cause of tracking or skipping problems of the CD player may point to electrical or mechanical failures.)

Management for Engineers (page 18)
• To Achieve Success, You Have to Define It
(Never trying means that you won't fail, but it also guarantees that you won't succeed.)

• **Directions in Camera Design** (page 26)
By Rick Lehtinen, TV technical editor
The increasing use of CCD pickups and the interest in improved definition has placed new requirements on TV lens systems. To a large measure, the quality of the picture created with a TV camera is determined by the sensor, but even with the best of sensing devices, pictures are no better than the lens. New designs in lens systems seek to avoid chromatic and other optical errors.
Interest: general, video/camera operators, engineers.
Key words: chromatic aberration, dispersion, refractive indices, prisms, microprocessor control, shutters.

• **Weather Radar Systems** (page 32)
By Raymond L. Durand, Technology Service Corporation, Santa Monica, CA
Radar is one of the most important tools in observing and tracking weather conditions. In addition to dial-up radar information, a new development allows compositing of data from overlapping National Weather Service radar sites to improve the image of the weather. The compositing process resolves some of the shortcomings of regular radar installations.
Interest: general, engineering, weather forecasters.
Key words: radar compositing, precipitation attenuation, earth curvature, ground clutter, S-band RF, X-band RF, NWS radar.

• **Newsroom Automation** (page 44)
By Rick Lehtinen, TV technical editor
Newsroom computers have grown from super word processors to systems that serve as the hub of news generation and production. Connectivity ties the newsroom computer to a wide range of peripherals, such as prompters, titlers, automated cart machines, still stores, switching and camera automation controllers. The result is a simplification of the presentation of the local news as well as election night coverage and other special events.
Interest: general, video technicians, production.
Key words: connectivity, embedded commands.

• **Stereo TV Grows Up** (page 52)
By Dennis Ciapura, Noble Broadcast Group and TEKNIMAX, San Diego
The reception of stereo television by viewers brings the importance of this TV medium upgrade to the spotlight. The question in 1986 was when to convert to stereo, but the concern in 1988 is how to engineer the best stereo sound to be competitive. Suggestions for implementation of stereo include cautions in regard to compatibility with surround sound and the use of stereo synthesis equipment.
Interest: general, management, programming, technical management.
Key words: MTS stereo, surround sound, stereo synthesizers, X–Y/M-S stereo mics, differential distortion.

• **Moving Into R-DAT** (page 63)
By Brad Dick, radio technical editor
Combining the concepts of digital signals with rotating-head recording, R-DAT provides new capabilities to audio production and new levels in performance. Six operating modes cover the gamut of possible applications with 32kHz, 44.1kHz and 48kHz sampling frequencies, but certain modes may not be included in some equipment as a means to reduce CD pirating. This factor, combined with the price tag associated with R-DAT and new optical disk technologies, contributes to a questionable future for R-DAT.
Interest: general, audio technicians, engineers.
Key words: rotary head, stationary head, sampling frequencies, overwriting, automatic track finding, subcodes, copycode.

Applied Technology (page 76)
• The D-1 and D-2 Formats
By Rick Lehtinen, TV technical editor, and Carl Bentz, technical and special projects editor
(An examination of the signal-processing systems of D-1 and D-2 digital video recording systems uncovers some similarities and differences in the two formats and includes a discussion of the concepts of error detection and correction.)

Station-to-Station (page 94)
• Formulas Aid in Plotting Coordinates
By Dane E. Ericksen, P.E., Hammett & Edison Consulting, San Francisco
(A discussion of methods and programs to calculate the length of degrees in longitude and latitude can bring greater accuracy to plotting and retrieving of geographic coordinates.)

Field Report (page 102)
• Shure SM89 shotgun microphone

SBE Update (page 107)
• Candidates Prepare for Election
• Board of Directors
• Frequency Coordination Manual
• National Involvement (in frequency coordination)

SEPTEMBER 1988

Theme: Audio-Video Control Systems

Editorial (page 6)
• Enough Already!
(Technical and financial aspects have an impact, although not always favorable, on the broadcast industry and local markets as additional station licensees join in the quest for advertising dollars.)

FCC Update (page 8)
• Power Boost Proposed for Class A FM Stations
• RKO Permitted to Sell Stations
• Telco-Cable Rules May Relax
• Anti-Lottery Rules Enforced
• Broadcast of Telephone Conversations

Strictly TV (page 10)
• The Definition of High Definition, Part 2
(Continued observations of HDTV, proposed "compatible" higher-definition systems and an improved NTSC signal leave the TV industry uncertain as to which route to take. Equally uncertain is the industry's ability to get behind a system and push it into reality.)

re:Radio (page 12)
• Some Tips on Antenna Matching
(Getting the directional array to operate correctly requires an understanding of matching networks, phase shift and antenna resistance.)

Satellite Technology (page 14)
• Let's Call it Frequency Sharing
(More efficient use of satellite system frequencies is the purpose of frequency reuse or sharing, made possible through signal polarization.)

Circuits (page 16)
• Looking Behind the Glass, Part 1
(Consumer electronics and economic realities influence the design and availability of equipment for professional and broadcast applications, witness the status of the video monitor display device.)

Troubleshooting (page 18)
• CD Player Repair Requires Skill, Part 6
(This installment in the series on compact disc players investigates the RF amplifier, the EMF decoder and wave-shaping necessary to recover the signals read from the disc.)

Management for Engineers (page 20)
• Techniques for Dealing With Problem Behavior, Part 1
(The behavior of manipulative or otherwise difficult members of the staff creates problems and stressful working conditions, as well as limiting creativity and productivity.)

• **Wiring an Audio-Video Facility** (page 26)
By Tony Mitchell, Centro Corporation, Salt Lake City
System design requires attention to equipment and building costs, just as much as to

technical operation aspects. With the concepts of a CAD system, the designer is able to track details as block diagrams, equipment lists, architectural/mechanical layouts and other aspects are developed. Another advantage of designing by CAD is the ability to analyze "what if" situations when trying to justify expenditures and functionality.
Interest: management, chief engineers.
Key words: cost justification, system ergonomics.

Related material:
• **Acoustical Problems of Studio Wiring** (page 30)
By Eric Neil Angevine, P.E., School of Architecture, Oklahoma State University, Stillwater, OK
Careful handling of studio wiring prevents sound paths that may jeopardize the acoustical integrity of a studio enclosure.

• **Distributing Audio-Video Signals** (page 40)
By Richard Maddox, technical writer, Lynnwood, WA
Upgrading the broadcast facility, especially for a move toward stereo audio, means increased attention to the needs of signal distribution. Do sources tie directly to a master router, followed by appropriate distribution amplifiers, or is it better to use a DA for each source? A new generation of DAs offers improved slew rates, wider bandwidths and lower noise ratings.
Interest: engineering, facilities designers, studio technicians.
Key words: composite, component and digital facilities; distribution amplifiers; equalization; signal bandwidths; cable characteristics.

• **The Science of Close-Field Monitors** (page 46)
By John Eargle, JME Consulting, Los Angeles
The large monitor speaker systems typically found in recording and production studios are essential during the original recording and overdubbing sessions. In the final stages of preparing material to be released to the public, engineers lean toward a pair of smaller speakers, more in line with equipment the public will use to listen to the recording. The article explains close-field and its advantages.
Interest: audio technicians, engineers.
Key words: close-field, near-field, free-field, direct-field, far-field, frequency response, array size, power capability, dispersion, time-domain response.

• **Broadcast Satellites: Making Connections** (page 52)
By Rick Lehtinen, TV technical editor
An overview of satellites as a communications medium provides insight to satellite construction, launch, control and operation. Of interest to broadcasters is the use of satellites as a method of program delivery or in news-gathering operations from remotely located sites. A new service, radio determination satellite systems, has potential applications for broadcasters as well. No matter what the use of the satellite system, care and maintenance of the downlink (and uplink) play an important part in continued successful communications.
Interest: general, engineering.
Key words: Molniya, geosynchronous, stabilization, orbital dynamics, polarization, VSAT, RDSS, LORAN, de-icing.

• **Translator System Planning and Installation** (page 70)
By Richard Maddox, technical writer, Lynnwood, WA
The limitations imposed by the spectra of FM radio and television, terrain and earth curvature and manmade structures can be overcome through the use of translator systems. Translators, boosters and, to some extent, LPTV installations extend the coverage area by receiving the primary signal and retransmitting it into shadowed areas.
Interest: engineering, management, RF technicians.
Key words: translators, boosters, LPTV, Part 74, frequency coordination, multipath interference.

• **Inside Fiber Optics** (page 90)
By Robert Griffiths, Telemet, Amityville, NY
This article provides a tutorial on the use of glass fibers as a medium of communication. Glass as a conductor, rather than copper, exhibits advantages unattainable by wire, one being the immunity of the signal to external RF and magnetic influences. Readers will gain insight into how signals, modulated onto light beams through LED devices, move through the glass material and what requirements must be met by the glass for successful use of optical fibers.
Interest: management, engineering, general.
Key words: fibers, cladding, reflections, modes, graded index, intermodal dispersion, critical angles.

Show Preview (page 104)
• A Rocky Mountain Setting for SBE
(A look at the combined efforts of the Society of Broadcast Engineers, the Rocky Mountain Video Expo and the Rocky Mountain chapter of the ITVA in preparation for the third annual convention to be held by SBE in the Denver convention center in September.)

Show Preview (page 110)
• SMPTE Sessions to Shine in Big Apple
("Innovations in Imaging and Sound" is the theme selected for the 130th SMPTE technical conference and equipment exhibit, to be held at the Jacob Javits Center, New York, in October.)

Applied Technology (page 116)
• Designing Facilities for Digital Video
By Curtis J. Chan, Centro Corporation, Salt Lake City
(Successful integration of the elements of a digital production facility places particular attention on the interfacing of data and communications format, as well as protocols that allow bidirectional conversations between all the equipment elements.)

Station-to-Station (page 126)
• Videotape Remote Control
By Art Battram, CFCN-TV, Calgary, Alberta, Canada
(A small panel with push-buttons provides 3-function control of four, remotely located VTRs or other equipment. Selection of which four transports are controllable at any given time is made through a patch panel.)

Field Report (page 130)
• Etron Programs Aid in Circuit Design

SBE Update (page 142)
• Future Convention Dates Are Set
• NFCC Manual
• Honorary Member (Dr. Thomas Goldsmith)
• Upgrade Your Membership

OCTOBER 1988

Theme: Managing Technology, Salary Survey

Editorial (page 6)
• Attack of the Telcos!
(A combination of fiber optics, computer technology and the telephone company has the potential to make major changes in the electronic entertainment industry.)

FCC Update (page 8)
• Advanced Television Policies Announced
• Main Studio Rule Clarified
• Cable Technical Standards to be Changed
• Network Affiliation Term to be Extended

Strictly TV (page 10)
• Inside the Visual PA, Part 1
(The first of a tutorial series on basics of TV concentrates on the components of the TV signal.)

re:Radio (page 12)
• Who Takes the Blame for Lo-Fi AM?
(After surveying the players in the AM broadcast world, it appears the most likely culprit for the state of AM is the receiver manufacturer.)

Satellite Technology (page 14)
• Artificial Intelligence System in the Works
(NASA demonstrates the Systems Autonomy Executive Controller, suggests that artificial intelligence could oversee much of the routine duty in space flight control, command and communications.)

Circuits (page 16)
• Looking Behind the Glass, Part 2
(What are the technical differences between the delta-gun/dot-matrix CRT and the in-line gun CRT?)

Troubleshooting (page 18)
• Video Terminations Play Important Role, Part 1
(Proper matching of circuits and signals is important in audio, RF and video.)

Management for Engineers (page 20)
• Techniques for Dealing With Problem Behavior, Part 2
(Effective responses to problem behavior depend upon objectivity.)

• **8th Annual Salary Survey** (page 26)
By Brad Dick, technical editor
The annual survey of salaries paid to broadcast industry employees in management, engineering and operations positions shows a 1% drop for operators to an increase of 14% for managers, based on across-the-board calculations for all markets. Engineering paychecks increased by a modest 4%. Non-

commercial station salaries fall in line with top 100 market commercial stations. SBE-certified engineers enjoy a 16% advantage over non-certified colleagues.
Interest: general.

• **Using Management Science in Broadcasting** (page 44)
By Marvin Born, Gulf Coast Broadcasting, Corpus Christi, TX
To help realize a major construction project, to complete the project on time and to stay within the budget, computer projects can handle much of the detail work. Some of the available management tools, such as Pert and Gantt charts, help to line out the project, determine the critical path to its successful conclusion and prevent pitfalls that might result in delays. Although all this is possible without using a computer, the ability to re-evaluate and adjust plans and consider "what-if" situations shows how useful the PC can be.
Interest: engineering management, management.
Key words: Pert and Gantt charts, project management, strategies, tactical planning, critical path.

• **The Art of Project Management** (page 56)
By Rick Morris, broadcast systems division, NBC
Management of a project can be broken down into seven major steps, ranging from performance objectives, equipment selection and getting bids to testing the equipment and conducting training sessions. Just making the plans is not enough, however, because proper management means you also must track the progress. Besides helping you do the job better, the step-by-step approach will make others more confident in your performance.
Interest: general, management.
Key words: performance objectives, environmental needs, project tracking.

• **Managing the PCB Risk** (page 68)
By Brad Dick, radio technical editor
At one time, polychlorinated biphenyls seemed to be a cost-effective solution to the problems of keeping high-power capacitors, inductors and transformers working at top efficiency. Little did anyone realize the health hazards presented by PCBs. Now that we know the PCB legacy, we must try to rid ourselves and our transmitting facilities of these hazards.
Interest: general, engineering management.
Key words: PCBs, polychlorinated biphenyls, Askarel, PCDFs, PCDDs, bioaccumulation, biomagnification, approved disposal.

• **Formulating Tape for Digital Applications** (page 96)
By Rick Lehtinen, TV technical editor
With each improved videotape recording format come new requirements to be met by the tape medium. The increased packing of data is accomplished by smaller, more refined magnetic particle size in the oxide layer. Binders and base films, as well as abrasives and lubricants, all determine whether a tape formulation will serve a format properly. To match the requirements of today's magnetic recorders, manufacturers have moved to metallic tapes to meet coercivity specifications.
Interest: recording technicians, engineers, general.
Key words: base film, oxide, magnetic coating, lubricants, abrasives, binders, coercivity, retentivity, RF output, MET, adsorption.

• **Planning an STL System** (page 116)
By Ronald Balonis, WILK-AM, Wilkes-Barre, PA
Designing the STL microwave path includes calculation of Fresnel zone clearance to achieve a reasonable reliability factor and the identification of sources of multipath effects. Topographic maps are useful in determining possible obstructions in the path. Frequency coordination is also important in planning and designing a reliable, trouble-free STL system.
Interest: RF engineers, engineering management.
Key words: path engineering, Fresnel zones, frequency coordination, multipath fading, minimum clearance, system reliability, fade margins, critical path.

• **News Special Report: The American View of HDTV** (page 140)
By Howard T. Head, A. D. Ring & Associates, Washington, DC
From its inception, television has undergone many increases in definition. HDTV represents a larger step in the evolutionary story than any yet taken and poses a change in broadcasting as we have come to know it. Many questions remain unanswered, and many decisions must be made. Among the uncertainties are the ultimate definition, aspect ratio and compatibility with present TV systems.
Interest: general.
Key words: Nipkow disks, the Fibonacci rectangle, aspect ratio, compatibility, spectrum requirements.

Applied Technology (page 146)
• New Suspension Design Yields Improved CRTs
By C. Admiraal and H. Bongenaar, Philips Components Division, Eindhoven, the Netherlands
(A new method of suspending the shadow mask of the CRT improves the stability of the mask-to-screen dimension to maintain color purity.)

SBE Update (page 152)
• Awards Bestowed in Denver
• Chapter Awards Presented
• Professional Licensing and Certification
• Convention Review

Station-to-Station (page 154)
• Auto-Start Circuit Can Save the Day
By Carl Shelenberger, WFTW-AM/FM, Ft. Walton Beach, FL
(An auto-start circuit on the emergency power generator helps to reduce downtime.)

Field Report (page 156)
• The Fortel Turbo 2 TBC

NOVEMBER 1988

Theme: 5th Annual Station Maintenance Special

Editorial (page 6)
• Parts is Parts
(One solution to the replacement parts problem is to order spares when you buy a product.)

FCC Update (page 8)
• Follow the Rules That Still Exist
• Operator on Duty
• Chief Operator
• Station Log
• Controlling Remote Sites

Strictly TV (page 10)
• Inside the Visual PA, Part 2
(Square wave test signals at 60Hz and 15kHz for monitoring of tilt and rounding detect low- and high-frequency response problems.)

re:Radio (page 12)
• Let the FCC Know What You Think
(Broadcasters should respond to FCC-proposed rulemaking MM Docket 88-376 regarding AM technical changes and 88-375 regarding FM Class A power.)

Satellite Technology (page 14)
• Space Junk Caught in Dangerous Orbit
(Four million pounds of debris pose possibility of disaster in space program.)

Circuits (page 16)
• Digital Sampling in Real Time
(Direct comparison method with a fast A/D converter, memory buffer and fast digital signal manipulation needed for real time work.)

Troubleshooting (page 18)
• Video Terminations Play Important Role, Part 2
(Replacing all video terminations with units of 0.1% precision may solve inexplicable level variations.)

Management for Engineers (page 20)
• Techniques for Dealing With Problem Behavior, Part 3
(Methods to circumvent negative attitudes are discussed.)

• **Maintaining Broadcast Equipment** (page 23)
By Jerry Whitaker, editorial director

• **On the Bench** (page 26)
Servicing of many types of hardware requires special test fixtures and test equipment. Budgetary consideration should be made for the acquisition of special test products needed to maintain newly purchased equipment. Making certain that the workshop is well-equipped leads to more efficient troubleshooting and maintenance of station equipment.
Interest: engineering management, maintenance technicians.
Key words: oscilloscopes, PWBs, jigs, fixtures; device side, cable side.

• **Solder: the Tin That Binds** (page 32)
As technology introduces new types of components to broadcast equipment, new approaches to maintenance are needed. A range of soldering and desoldering products are now available to aid in the repair of PWB circuitry. Characteristics of solder and components used on modular equipment help the technician to perform repair projects.
Interest: engineering management, maintenance technicians.

Key words: solder/desolder, silver solder, rosin core, reflow; corrosion, flux; surface mount.

• **Using Chemicals in the Shop** (page 38)
A variety of chemical products makes equipment maintenance procedures less difficult. Among these chemicals are a range of cleaning solvents and agents in aerosol and liquid forms for removal of normal and foreign contaminants. A knowledge of solvents and their reaction with materials is important for proper equipment maintenance.
Interest: engineering management, maintenance technicians, equipment operators.
Key words: solvents, applicators, compressed gas, lubricants.

• **Preventing ESD Failures** (page 46)
Electrostatic discharge (ESD) has become one of the greatest hazards to the new generation of solid-state devices. With the introduction of advanced IC and discrete devices, maintenance personnel must realize the importance of static-control procedures. Following correct procedures in regard to static electricity and new technology can spell the difference between a successful repair project or serious damage to the equipment.
Interest: engineering management, maintenance technicians, equipment operators.
Key words: ESD, static electricity, static discharge.

• **Finding Replacement Parts** (page 54)
The task of maintaining older equipment often proves difficult, either because the equipment manufacturer fails to maintain a stock of some parts, or the component manufacturer changes the design of the component. The repair technician must have a basic understanding of system operation to know whether a replacement part will perform in the same manner as the original component.
Interest: engineering management, maintenance technicians.
Key words: universal replacements, JEDEC outlines.

• **Managing a Studio Maintenance Program** (page 62)
By Ronald Balonis, WILK-AM, Wilkes-Barre PA
Maintenance programs usually break down to three areas: preventive, crisis and predictive maintenance procedures. A trouble log, located near equipment, provides an effective form of documentation on studio systems, assists in maintaining a replacement parts inventory and increases repair shop productivity. The engineering do list places priorities on tasks for more efficient maintenance procedures.
Interest: engineering management, maintenance technicians.
Key words: levels of maintenance, trouble logs, do lists, task pyramids, time management.

• **Maintaining the Studio Environment** (page 74)
By Eric Neil Angevine, P.E., Oklahoma State Univ., Stillwater, OK
Lighting fixtures, room surfaces and acoustical materials, and their effects on studio operation, must be considered as the studio ages. The studio is more than just a room; it requires maintenance just as much as the equipment in it.
Interest: engineering and production management, maintenance technicians, production personnel.
Key words: acoustical materials, lighting fixtures, carpet, sound seals, mechanical noise sources.

• **The National Electrical Code: What's in it for Us?** (page 78)
By Elmer Smalling III, Jenel Systems & Design, Dallas
The National Electrical Code (NEC) is a compendium of proper application of electrical power for any purpose. Included in the code are practical safeguards to protect people and property from electrical hazards. Although much of the code is simply common sense, it should be studied by all personnel involved in power distribution in the broadcast facility.
Interest: engineering, building maintenance management.
Key words: NEC, electrical safety, grounding, branch circuits, electrical calculations, wiring methods.

Field Report (page 90)
• Otari MX-55 Tape Recorder

Station-to-Station (page 102)
• Using a Computer for Engineering
(Various applications for CAD programs in the broadcast facility are examined.)

SBE Update (page 114)
• Convention Rates High Marks
• Satisfied Attendees and Exhibitors
• People Are the Key
• Election Results
• Board Meeting
• Office Changes (new mailing address for national office)

DECEMBER 1988

Theme: Industry Forecast

Editorial (page 6)
• Too Many Shows?
(Is the large number of broadcast industry trade shows really necessary?)

FCC Update (page 8)
• FCC Relaxes Media Diversification
• Proposing AM Modifications
• Seeking Repeal of Compulsory License
• Typical Rule Violations

Strictly TV (page 10)
• Inside the Visual PA, Part 3
(Response to mid and upper frequencies determines transient and group delay characteristics.)

re:Radio (page 12)
• Reach for LPTV Opportunities
(AM and FM broadcasters can enhance business income with LPTV license.)

Satellite Technology (page 14)
• Getting Into Orbit
(The processes of obtaining and maintaining final orbit are discussed.)

Circuits (page 16)
• Application-Specific ICs

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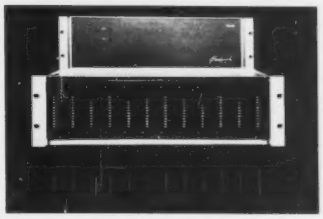

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(Various areas of the IC design process are investigated.)

Troubleshooting (page 18)
- Take the Option to Rent

(Test equipment rental plans make economic sense for occasional-use, high-ticket items.)

Management for Engineers (page 20)
- Techniques for Dealing With Problem Behavior, Part 4

(Examples are given of events that trigger behavior problems on the job.)

- **State of the Industry Report** (page 26)

By Brad Dick, technical editor

Based upon the results of the annual survey, this article examines the health of the broadcast industry. Equipment buying plans for 1989 is the key information taken from the survey to determine the major equipment trends on the industry horizon.
Interest: engineering management, station managers.

- **View From the Top** (page 34)

By Jerry Whitaker, editorial director

Interviews with top engineering vice presidents of major radio and TV group operations examine opinions and views about where technology will take us in the next few years. Group and network operations are key players in the development of new technologies that will benefit all participants in the radio and TV industry.
Interest: engineering management, station managers.

- **The Bottom Line in Broadcasting** (page 46)

By Jerry Whitaker, editorial director

How is technology reshaping the broadcast industry? This article focuses on the key trends for the professional audio and video industries as a whole. The unrelenting push of technology continues to change the rules, even as the ball game is being played.
Interest: engineering management, station managers.

- **The Klystrode in Operation** (page 64)

By Jerry Whitaker, editorial director

When the hybrid device that combined the best parts of power tetrodes and klystrons was announced, advantages provided by the new amplifier product included predictions for greater efficiency in UHF TV transmission. With the first Klystrode transmitter in operation for approximately six months, this article examines how well the device has measured up to the predictions and discusses what lies ahead in UHF transmissions.
Interest: engineering management, RF engineers.
Key words: Klystrode, klystron, power tetrodes, efficiency.

Show Replay (page 84)
- IBC '88: The HDTV Showdown

(A review of the 1988 International Broadcasting Convention, in Brighton, England, considers some of the technical presentations and equipment introductions from the exhibition.)

SBE Update (page 120)
- Apply for Testing
- International Interest (about certification)
- Official Attends Texas Convention
- Professional Licensing
- Membership Directory

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New Approaches to Audio Console Design 7-26

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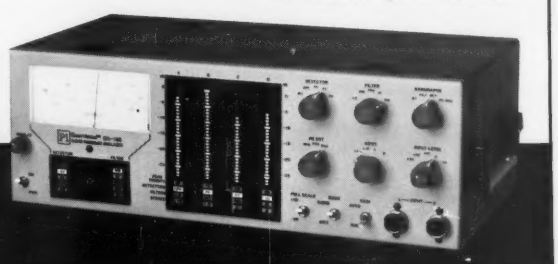

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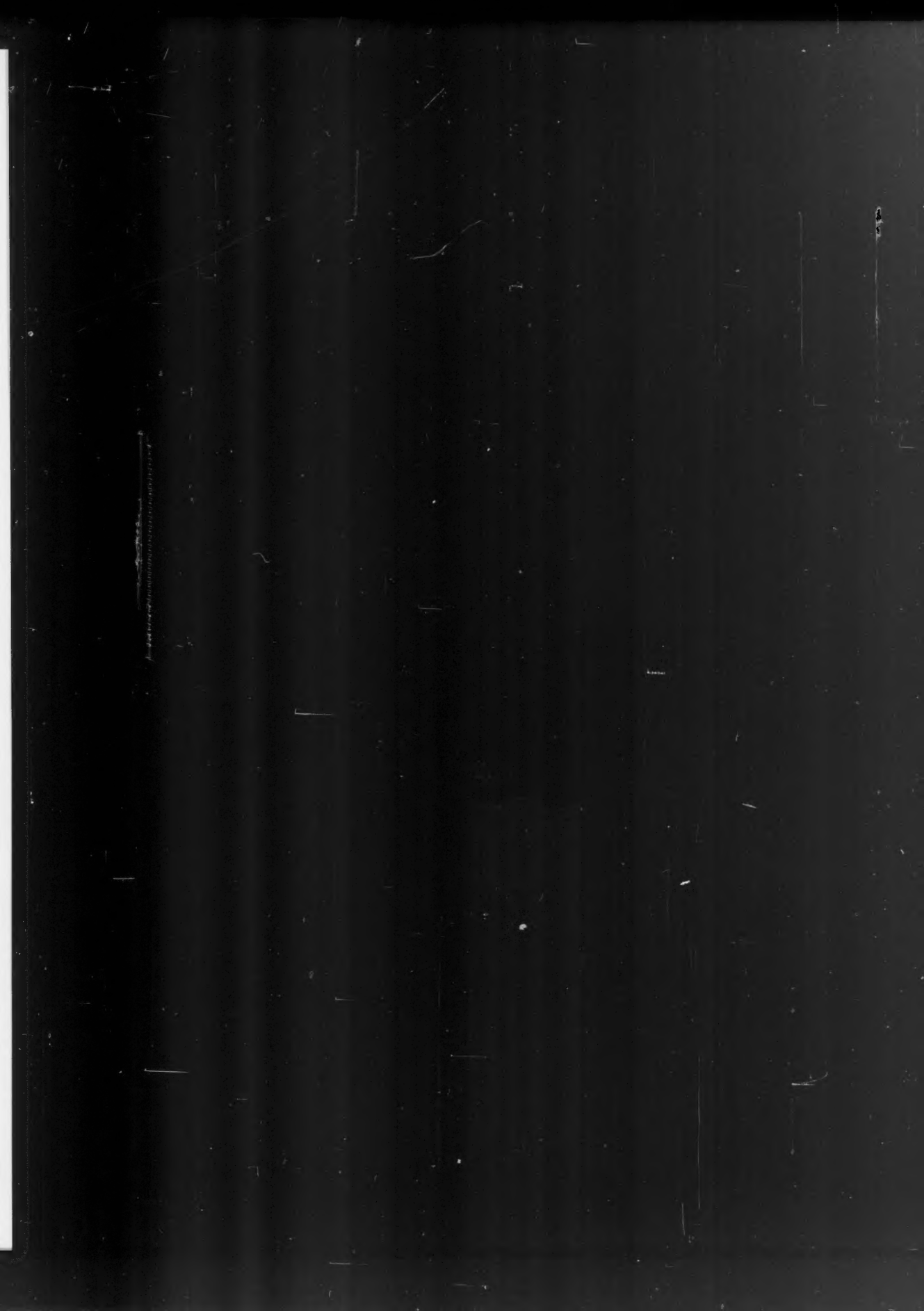
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